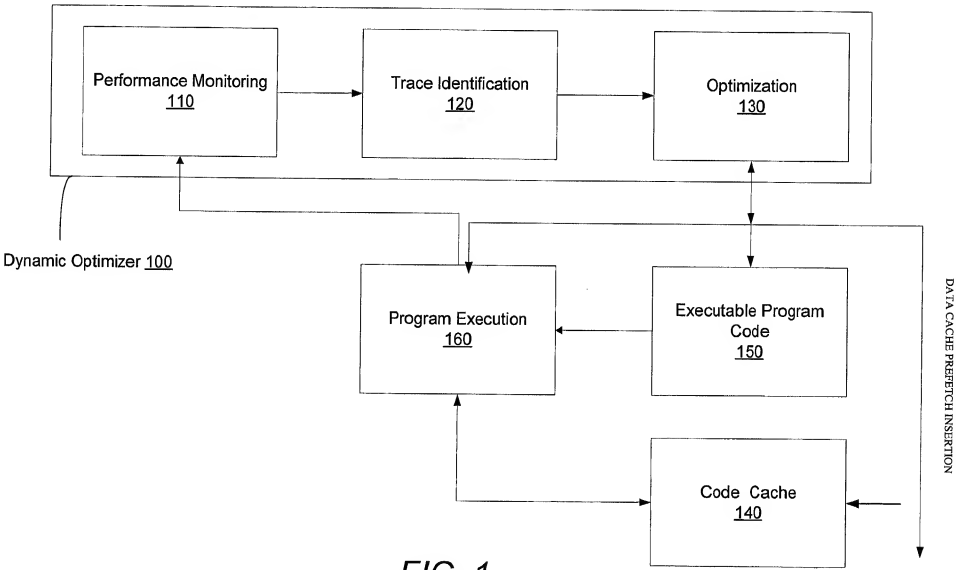

FIG. 1

Collect information describing cache miss events
210
Identify a performance degrading instruction
215
Optimize the program to provide an optimized sequence of instructions that includes at least one prefetch instruction
220
Modify the execution of the program to include the optimized sequence of instructions
230

FIG. 2

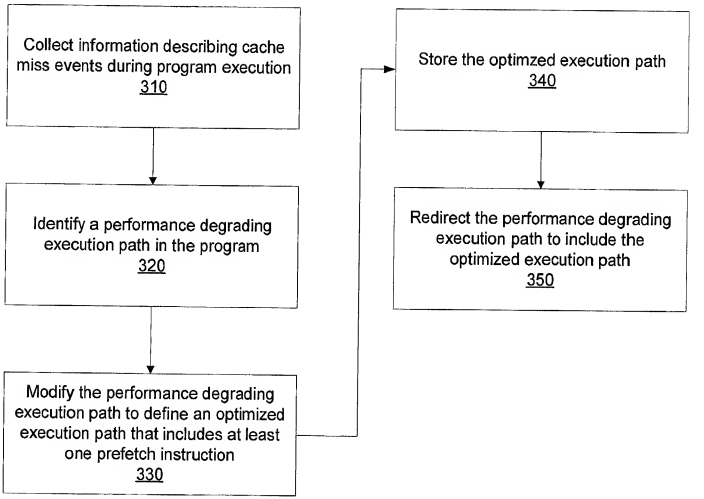
Collect information describing cache miss events during program execution
310
Identify a performance degrading execution path in the program
320
Modify the performance degrading execution path to define an optimized execution path that includes at least one prefetch instruction
330
Store the optimzed execution path
340
Redirect the performance degrading execution path to include the optimized execution path
350

FIG. 3

Attorney Docket No.: SP-6823 US
First Inventor: Khoa Nguyen
Title: METHOD OF EFFICIENT DYNAMIC DATA CACHE PREFETCH INSERTION

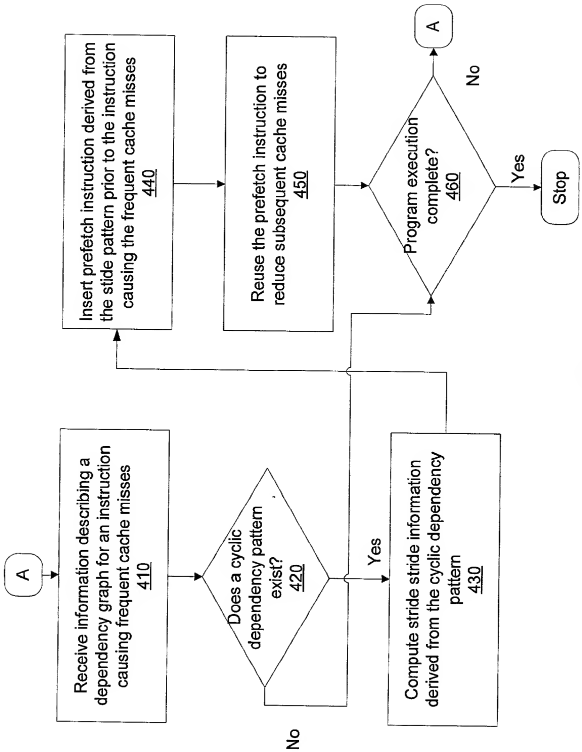

FIG. 4

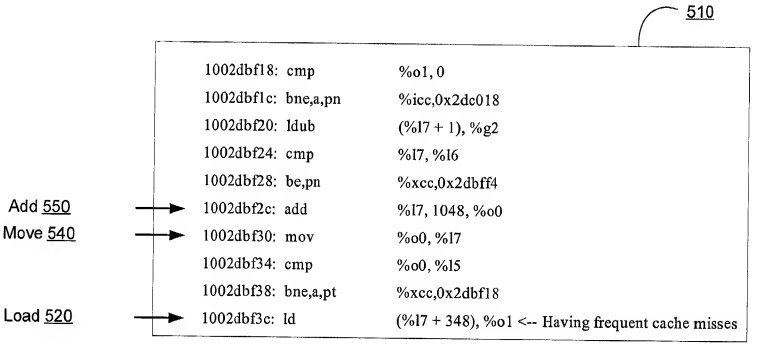
510
1002dbf18: cmp %o1, 0
1002dbf1c: bne,a,pn %icc,0x2dc018
1002dbf20: ldub (%l7 + 1), %g2
1002dbf24: cmp %l7, %l6
1002dbf28: be,pn %xcc,0x2dbff4
Add 550
1002dbf2c: add %l7, 1048, %o0
Move 540
1002dbf30: mov %o0, %l7
1002dbf34: cmp %o0, %l5
1002dbf38: bne,a,pt %xcc,0x2dbf18
Load 520
1002dbf3c: ld (%l7 + 348), %o1 <-- Having frequent cache misses

FIG. 5A

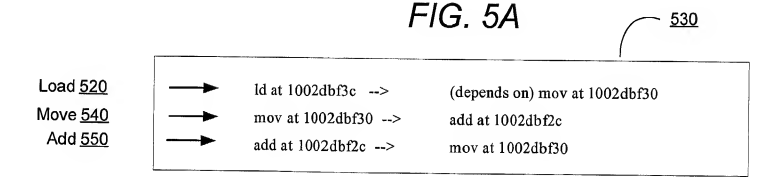
530
Load 520
ld at 1002dbf3c --> (depends on) mov at 1002dbf30
Move 540
mov at 1002dbf30 --> add at 1002dbf2c
Add 550
add at 1002dbf2c --> mov at 1002dbf30

FIG. 5B

```
1002dbf18:  cmp       %o1, 0
1002dbf1c:  bne,a,pn  %icc,0x2dc018
1002dbf20:  ldub      (%l7 + 1), %g2
1002dbf24:  cmp       %l7, %l6
1002dbf28:  be,pn     %xcc,0x2dbff4
1002dbf2c:  add       %l7, 1048, %l7
1002dbf30:  ldx       (%l7), %o1
1002dbf34:  cmp       %o0, %l5
1002dbf38:  bne,a,pt  %xcc,0x2dbf18
1002dbf3c:  ld        (%o1 + 348), %o1 <--- Having frequent cache misses
```

560

FIG. 5C

570

```
ld at 1002dbf3c    -->    ldx at 1002dbf30
ldx at 1002dbf30   -->    add at 1002dbf2c
add at 1002dbf2c   -->    add at 1002dbf2c
```

FIG. 5D

Network 600
Server 610(1)
Server 610(2)
Server 610(3)
Server 610(4)
Server 610(N-1)
Server 610(N)
Client Computer 620(1)
Client Computer 620(2)
Client Computer 620(3)
Client Computer 620(4)
Client Computer 620(5)
Client Computer 620(6)
Client Computer 620(7)
Client Computer 620(8)
Client Computer 620(N-1)
Client Computer 620(N)

FIG. 6

Computer System 710
Bus 712
Central Processor 714
System Memory 716
I/O Controller 718
Network Interface 748
Modem 747
Serial Port 730
Floppy Disk Unit 736
Floppy Disk 738
Display Adapter 726
Serial Port 728
Keyboard Controller 733
Storage Interface 734
Fixed Disk 744
Display Screen 724
Mouse 746
Keyboard 732
Audio Interface 722
Speaker System 720
Optical Disk Drive 740
Optical Disk 742

FIG. 7

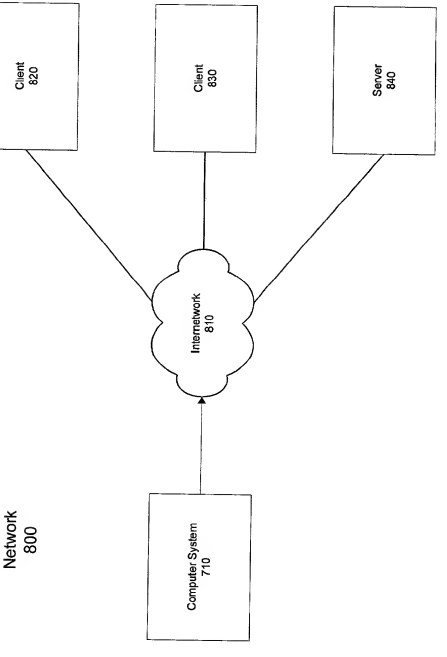
Network
800
Computer System
710
Internetwork
810
Client
820
Client
830
Server
840

FIG. 8